



ENERGY STAR® Program Requirements for Telephony

Partner Commitments

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified telephony products. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on telephony products and specifying the testing criteria for telephony products. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;
- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR marks and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR telephony model within one year of activating the telephony portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified telephony products. The ENERGY STAR mark must be clearly displayed on the top/front of product, on product packaging, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying telephony models. Once the Partner submits its first list of ENERGY STAR qualified telephony models, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers.
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified telephony products shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;
- notify EPA of a change in the designated responsible party or contacts for telephony products within 30 days.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR mark for buildings;
- purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;
- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
- provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;
- feature ENERGY STAR on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.



ENERGY STAR® Program Requirements for Telephony

Draft 1 Eligibility Criteria (Version 2.0)

Below is DRAFT 1 (Version 2.0) of the ENERGY STAR telephony product specification. A product must meet all of the identified criteria if it is to be qualified as ENERGY STAR by its telephony manufacturer.

- 1) **Definitions:** Below is a brief description of telephony products and their common operational modes as relevant to ENERGY STAR. The ENERGY STAR specification focuses on reducing energy consumption while the product is in the Standby Mode.
 - A. **Additional Handset:** A commercially available electronic product with a handset, charging base and battery, designed for use with Multi-Handset capable phone systems. To qualify, the charging base of the cordless phone or its power supply must be designed to plug into a wall outlet and there must not be a physical connection between the portable handset and the phone jack.

NOTE: Per an amendment issued by EPA on January 14, 2004, additional handsets are able to earn the ENERGY STAR, provided that they meet the appropriate energy-efficiency criteria. A definition for these products has been added under this Version 2.0 specification.

EPA would like to know if there are any additional telephony products that manufacturers feel should be included in this Version 2.0 ENERGY STAR telephony specification.

- B. **Cordless Telephone:** A commercially available electronic product with a base station and a handset whose purpose is to convert sound into electrical impulses for transmission. Most of these devices require an external power supply for power, are plugged into an AC power outlet for 24 hours a day, and do not have a power switch to turn them off. To qualify, the base station of the cordless phone or its power supply must be designed to plug into a wall outlet and there must not be a physical connection between the portable handset and the phone jack.
 - C. **Answering Machine:** A commercially available electronic product—also known as a telephone answering device (TAD)—whose purpose is to provide analog or digital storage of outgoing and incoming telephone messages by connecting to the telephone line between the phone and the phone jack. Most of these devices require an external power supply for power and are plugged into an AC power outlet for 24 hours a day. To qualify, the answering machine or its power supply must be designed to plug into a wall outlet.
 - D. **Combination Cordless Telephone/Answering Machine:** A commercially available electronic product in which the cordless telephone and answering machine are combined into a single unit and which meets all of the following criteria: the answering machine is included in the base station of the cordless telephone; it is not possible to measure the power requirements of the two components separately without removal of the telephone casing; and the unit is connected to the wall outlet through a single power cable. Most of these devices require an external power supply for power, are plugged into an AC power outlet for 24 hours a day, and do not have a power switch to turn them off. To qualify, the combination unit or its power supply must be designed to plug into a wall outlet.
 - E. **Multi-Handset Model:** This cordless phone system requires only one base and phone jack and, as the name implies, can support multiple cordless handsets. Each handset added to the system comes with a battery and a charging base.
 - F. **Single Voltage External Ac-Dc Power Supply:** Please refer to the ENERGY STAR Program Requirements for Single-Voltage External Ac-Dc and Ac-Ac Power Supplies for the definition of a single voltage external ac-dc power supply, as it pertains to ENERGY STAR.

- G. Single Voltage External Ac-Ac Power Supply: Please refer to the ENERGY STAR Program Requirements for Single-Voltage External Ac-Dc and Ac-Ac Power Supplies for the definition of a single voltage external ac-ac power supply, as it pertains to ENERGY STAR.

NOTE: Definitions for single voltage external ac-dc and ac-ac power supplies have been added above to reflect the external power supply requirements contained within this Version 2.0 specification.

- H. Cellular Telephone: A cellular telephone uses radio waves to connect to the cellular telephone carrier. Cellular telephones are not eligible to carry the ENERGY STAR label under this specification as they are not considered cordless telephones.
- I. Cordless Telephone: Cordless telephones provide the same services as cordless telephones except that there is a physical connection between the handset and the jack, which limits the user's mobility while using the telephone. Cordless telephones may or may not require an external power supply for power. Cordless telephones and combination units are not covered by this cordless telephone specification and may not qualify as ENERGY STAR.
- J. Spread Spectrum Technology (SST): There are two types of spread spectrum technology, direct sequence (e.g., digital spread spectrum or DSS) and frequency hoppers. Both types are available in some digital telephony products to provide enhanced transmission range, extendable portable numbers, and additional security.
- K. Standby Mode: The product is connected to a power source and is inactive (i.e., the unit is not transmitting a conversation or recharging a low battery); in TAD the product is idle. In this mode, conventional units may consume energy to operate circuitry and to overcharge rechargeable batteries.
- L. Active Mode: The product is connected to a power source and is transmitting telephone conversation, and/or playing/recording a message, and/or supplying current to a low battery to charge it. The power requirement in this mode is typically greater than the power requirement in Standby Mode.
- M. Disconnect: The product is disconnected from all external power sources.
- 2) **Qualifying Products**: Telephony product types that are covered by this EPA specification are: analog and digital cordless telephones, multi-handset cordless telephones, answering machines, combination cordless telephones/answering machines, multi-handset combination cordless telephones/answering machines, and additional handsets using a variety of frequency ranges (e.g., 5.8Ghz, 2.4Ghz, 900Mhz, 46/49Mhz). Any cordless telephone, multi-handset cordless telephone, answering machine, combination cordless telephone/answering machine, multi-handset combination cordless telephones/answering machine, or additional handset that is marketed to the consumer in this way and meets the product definition in Section 1 is eligible to earn the ENERGY STAR. Please note that mobile/cellular and corded telephones may not qualify for ENERGY STAR at this time.
- 3) **Energy-Efficiency Specifications for Qualifying Products**: Only those products listed in Section 2 that meet the criteria below, may qualify as ENERGY STAR.
- A. System-Level Efficiency Requirements

Table 1: Energy-Efficiency Criteria for ENERGY STAR Qualified Telephony

Product Category*	Version 2.0 Standby Mode
• Additional Handset	≤ 1 watt
• Answering Machine • Cordless Telephone • Multi-Handset Cordless Telephone	≤ 2 watts
• Combination Cordless Telephone/Answering Machine • Multi-Handset Combination Cordless Telephone/Answering Machine	≤ 2.5 watts

***Note:** Any power consumed by the external power supply must be included when metering the unit for ENERGY STAR qualification.

NOTE: EPA's proposed energy-efficiency criteria in Table 1 were developed by conducting: (i) an analysis of telephony products that are currently ENERGY STAR qualified, (ii) testing of several non-qualified models and analyzing the results, and (iii) an analysis of the effects of incorporating an efficient external power supply into telephony products. Manufacturers are encouraged to (i) test their own products, particularly new models and models in development, and to share the results with EPA to include in the data analysis, and (ii) comment on levels proposed in this document.

A separate analysis was conducted on those products with SST. In the majority of cases (85%), it was found that telephony products with SST did not consume significantly more power than those products without SST. Based on these findings, EPA feels that a power consumption allowance for telephony products incorporating this technology is no longer needed in the Version 2.0 specification. As always, manufacturers are welcome to comment on this proposal and to suggest alternatives as needed.

Please note that EPA is considering further reducing the standby specification for all telephony products to 1 watt or less beginning on July 1, 2007. This date coincides with the proposed implementation of the Tier 2 external power supply requirement in telephony. Please see Section 5 of this Version 2.0 specification for additional details. Manufacturers are encouraged to provide comments on this proposal.

- B. External Power Supply Efficiency Requirements: All telephony products must use external power supplies that meet or exceed the ENERGY STAR requirements for single voltage external ac-dc and ac-ac power supplies. To review and download the external power supply program requirements, visit the ENERGY STAR Web site at www.energystar.gov/powersupplies.

NOTE: Per a memorandum from EPA, dated July 19, 2004, it is EPA's intent that once finalized, the ENERGY STAR Program Requirements for Single Voltage External Ac-Dc and Ac-Ac Power Supplies will become an integral part of this Version 2.0 specification. In other words, to earn the ENERGY STAR, a telephony product will have to meet the requirements set forth in this Version 2.0 specification and use an ENERGY STAR qualified external power supply.

The ENERGY STAR Program Requirements for Single Voltage External Ac-Dc and Ac-Ac Power Supplies is nearing completion, as of the writing of this Draft 1 Version 2.0 telephony specification. Significant changes to the external power supplies specification are not envisioned at this time. However, if any material changes are made in the Final specification, they will be reflected in this Version 2.0 telephony specification and discussed with stakeholders.

- 4) **Test Methodology:** The following test procedure should be followed to ensure consistency in measuring the power requirements for electronics products. Outlined in Section A are the ambient test conditions that should be respected when performing power measurements. These conditions ensure that outside factors do not affect the test results and that the test results can be reproduced. Sections B and C describe the specifications for testing equipment and the test method, respectively. Section D specifies test criteria for external power supplies.

NOTE: No changes have been made to the test methodology for telephony products. However, given that the methodology has been in use for several years, manufacturers are encouraged to comment on any outdated, unnecessary, or missing language.

A. Test Conditions

General Criteria:

Total Harmonic Distortion (Voltage):	< 3% THD
Ambient Temperature:	22°C ± 4°C

Terminations: External speaker terminals terminated per 3.6.2.2 (IEC 107-1)

Market-Specific Criteria:

Market:	United States	Europe and Australia	Japan
Voltage:	115 V RMS ± 3 V RMS	230 V RMS ± 10 V RMS	100 V RMS ± 5 V RMS & 200 V RMS ± 10 V RMS
Frequency:	60 Hz ± 3 Hz	50 Hz ± 3 Hz	50 Hz ± 3 Hz & 60 Hz ± 3 Hz

Note: Testing needs to be done only at a voltage and frequency in the above range. It is not necessary to test all combinations of high voltage/low frequency, high voltage/high frequency, etc.

- B. Test Equipment: Manufacturers should measure and report the true standby power¹ requirements of the product. Doing so necessitates the use of a true power watt meter. Because there are many watt meters from which to choose, manufacturers need to exercise care in selecting an appropriate model. The following items should be considered when procuring equipment and performing the test:

1. AC Power Source (with sufficient output current for the test unit such that it meets the requirement for AC line voltage, frequency stability, and THD).
2. True Power Meter (with sufficient accuracy, resolution, crest factor rating, and bandwidth).
3. Oscilloscope with Current Probe (to monitor AC line current waveform, amplitude, and frequency. Optional but recommended).
4. True RMS Volt Meter (to verify voltage at the input of test unit. Optional if AC source output is sufficiently accurate).
5. Frequency Counter (to verify frequency at the input of test unit. Optional if AC source output is sufficiently accurate).

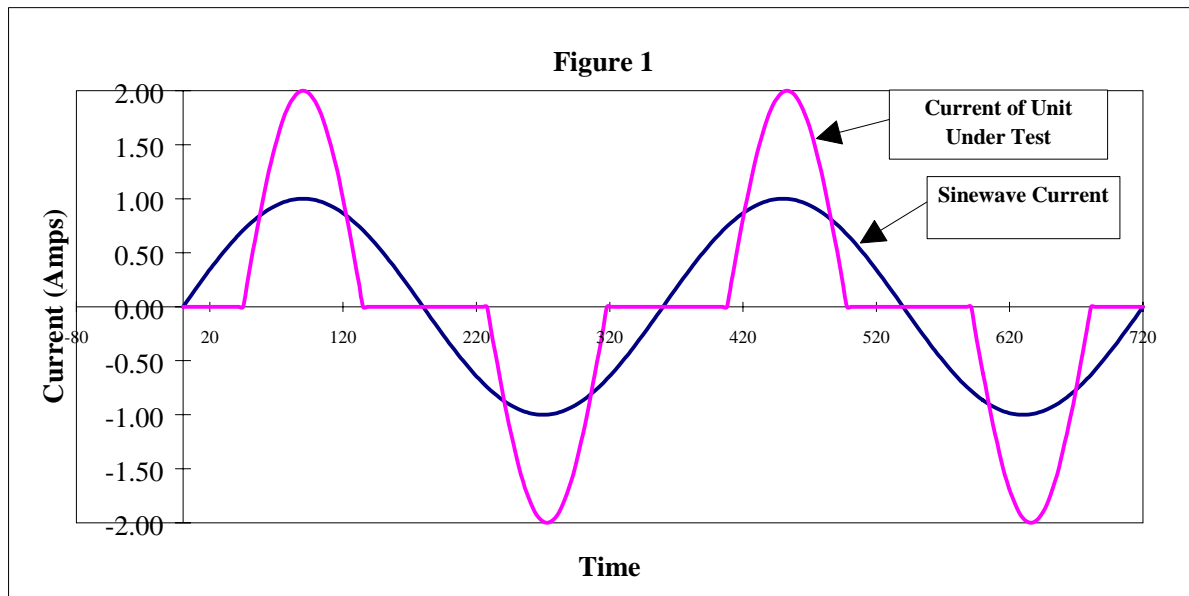
¹ True power is defined as (volts)x(amps)x(power factor) and is typically reported as watts. Apparent power is defined as (volts)x(amps) and is usually expressed in terms of VA or volt-amps. The power factor for equipment with switching power supplies is always less than 1.0; therefore, true power is always less than apparent power.

Crest Factor: Electronics equipment may draw current that is not sinusoidal.² While virtually any watt meter can measure a standard current waveform, it is more difficult to select a watt meter when irregular current waveforms are involved.

It is critical that the watt meter selected be capable of reading the current drawn by the product without causing internal peak distortion (i.e., clipping off the top of the current wave). This requires a review of the meter's crest factor rating and the current ranges available on the meter. Better quality meters will have higher crest factor specifications and more choices of current ranges.

To determine the crest factor rating requirement of the meter and the proper current range settings, the peak current (amps) draw of the product under test in standby mode must first be measured. This can be accomplished using an oscilloscope with a current probe.

A current range on the meter must be selected that is sufficient to register the peak current. Specifically, the full-scale value of the selected current range multiplied by the crest factor of the meter (for current) must be at least 15 percent greater than the peak current reading from the oscilloscope to compensate for any measurement error. (Note: It is difficult to measure within 5 percent using an analog oscilloscope.) For example, if a watt meter has a crest factor of 4 and the current range is set on 3 amps, the meter can register current spikes of up to 12 amps. If measured peak current is only 6 amps, the meter would be satisfactory. If, however, the current range is set too high, the meter may lose accuracy in measuring non-peak current. Therefore, some delicate balancing is necessary. When choosing a meter, make sure that the crest factor is given for the current level that you desire.



Frequency Response: Another issue to consider when selecting a watt meter is the frequency response rating of the meter. Electronics equipment may cause harmonic waveforms that can lead to inaccuracies in the power measurements. For example, electronics equipment powered by switching power supplies typically produces odd harmonics up to the 21st. To ensure that the harmonics are properly addressed, ENERGY STAR recommends the use of a watt meter with frequency response of at least 3 kHz. This will account for harmonics up to the 50th, which is recommended by IEC 555.

² The crest factor of a current waveform is defined as the ratio of the peak current (amps) to the RMS current (amps). The crest factor for a sinusoidal 60 Hz current waveform is always 1.4. The crest factor for a current waveform associated with a product containing a switching power supply will always be greater than 1.4 (though typically no higher than 8).

Resolution: Manufacturers should choose a watt meter that can provide resolution of 0.1 watt or better.

Accuracy: Catalogues and specification sheets for watt meters typically provide information on the accuracy of power readings that can be achieved at different range settings. If the power measurement is very close to the energy-efficiency guideline specified in these Program Requirements (Eligibility Criteria), a test procedure with greater accuracy will be necessary. For example, if the ENERGY STAR specification is 1.0 watt or less *and* the resulting accuracy of the watt meter at the test settings is ± 0.1 watts, then a power measurement of less than 0.9 watts will ensure that the product qualifies for ENERGY STAR.

Calibration: To maintain their accuracy, watt meters should be calibrated every year with a standard that is traceable to the US National Bureau of Standards (NBS).

- C. **Test Method:** The following are the steps to be used to measure the true power requirements of the product under test (PUT) in standby mode. To view the definition of true power, refer to Footnote 2 on page 6.

1. Power the PUT. When rechargeable batteries are involved, the PUT must be fully charged (allow up to 24 hours).
2. Power on all test equipment and properly adjust operation range. Connect the test equipment and PUT.
3. Check that the PUT is connected to an external phone jack before and during testing. This is done to ensure that the product is tested in a manner consistent with the way the consumer will use it.
4. Check that the PUT has all settings equal to the factory default settings (i.e., unit must be in the condition shipped to the customer).
5. Verify that the PUT is in standby mode (not disconnect mode).
6. Either verify that the wall outlet power is within specifications or adjust the AC power source output as described in Section A (e.g., 115Vrms \pm 3Vrms, 60Hz \pm 3Hz).
7. Set the power meter current range. The selected full scale value multiplied by the crest factor rating ($I_{\text{peak}}/I_{\text{rms}}$) of the meter must be greater than the peak current reading from the oscilloscope.
8. After the PUT reaches operating temperature and the readings on the power meter stabilize, (times may vary depending on product) take the true power reading in watts from the power meter.
9. Record the test conditions and test data. The measurement time shall be sufficiently long to measure the correct average value to within a +10% - 0% error, up to 24 hours but no less than 2 hours. If the device has different standby modes that can be manually selected, the measurement should be taken with the device in the most power consumptive mode. If the modes are cycled through automatically, the measurement time should be long enough to obtain a true average that includes all modes.

- D. **Test Methodology for External Power Supply:** The specifics for testing the energy efficiency of an external power supply model are outlined in Section 4 of the “ENERGY STAR Program Requirements for Single-Voltage External Ac-Dc and Ac-Ac Power Supplies,” which is available on the ENERGY STAR Web site. The test results produced by this procedure shall be used to determine if a model qualifies as ENERGY STAR.

- 5) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR, under the Version 2.0 specification, will be defined as the *effective date* of the agreement. The ENERGY

STAR Telephony (Version 2.0) specification shall go into effect on **January 1, 2006**. Any previously executed agreement on the subject of ENERGY STAR qualified telephony products shall be terminated effective December 31, 2005.

- A. Implementation of External Power Supply Requirements: The external power supply specification includes two tiers that take effect at different times (i.e., January 1, 2005 and July 1, 2006). Below are the proposed dates for implementing the external power supply requirements within this Version 2.0 specification.
1. Tier 1: Effective January 1, 2006, all ENERGY STAR qualified telephony products must include an ENERGY STAR qualified external power supply under Tier 1 of that specification.
 2. Tier 2: Effective July 1, 2007, all ENERGY STAR qualified telephony products must include an ENERGY STAR qualified external power supply under Tier 2 of that specification.
- B. Qualifying and Labeling Products Under the Version 2.0 Specification: All products, including models originally qualified under Version 1.0, with a **date of manufacture** on or after **January 1, 2006** must meet the Version 2.0 requirements in order to bear the ENERGY STAR mark. The **date of manufacture** is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.

NOTE: It is important to note that by the time the Version 2.0 telephony specification takes effect (as currently proposed), the ENERGY STAR specification for single voltage external ac-dc and ac-ac power supplies will already have been in effect for a year. In part, this is being done because EPA wants to ensure that telephony manufacturers have a variety of ENERGY STAR qualified external power supply models, from several different manufacturers, available for them to select from when designing products to meet Version 2.0.

In the event that significant changes are made to the ENERGY STAR Specification for Single Voltage External Ac-Dc and Ac-Ac Power Supplies before it is finalized, EPA will reconsider and discuss with stakeholders the effective dates for incorporating ENERGY STAR qualified external power supplies in qualified telephony products.

Telephony products manufactured prior to January 1, 2006 and qualified under the Version 1.0 specification can continue to carry the ENERGY STAR label until they are sold through the marketplace. Any products manufactured on or after January 1, 2006 must meet the requirements set forth under this Version 2.0 specification in order to earn the ENERGY STAR.

- 6) Future Specification Revisions: EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers or industry or its impact on the environment. In keeping with current policy, revisions to the specification will be discussed with stakeholders.